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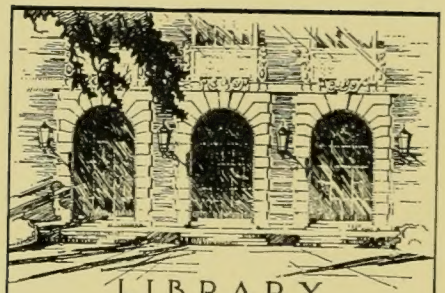

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DISTRIBUTION AND ABUNDANCE OF PHEASANTS IN ILLINOIS

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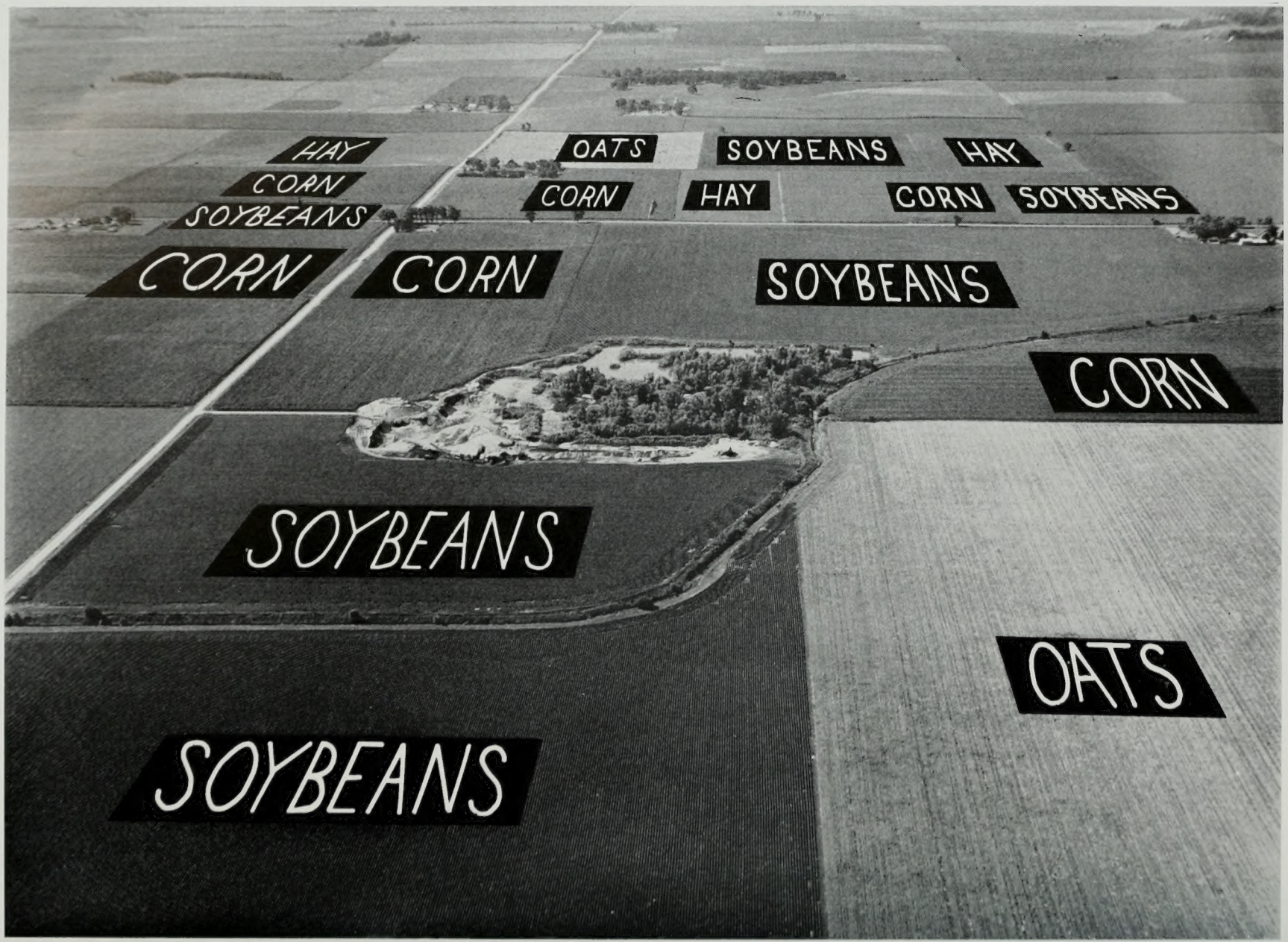

Fig. 1. — An aerial view in July of farmland in Ford County, east-central Illinois. Pheasants are more abundant in this intensively farmed region than elsewhere in the state. Gravel pits (one shown in the center foreground) are not common in this farming region.

DISTRIBUTION AND ABUNDANCE OF PHEASANTS IN ILLINOIS*

FREDERICK GREELEY, RONALD F. LABISKY, AND STUART H. MANN†

The exotic ring-necked pheasant (*Phasianus colchicus*), introduced into Illinois in the 1890's, has succeeded in establishing self-maintaining populations in approximately the northeastern third of the state. When the prairie chicken (*Tympanuchus cupido*) declined in number with the encroachment of intensified agriculture upon the grasslands of Illinois (Yeatter 1943:413), sportsmen found the pheasant to be a suitable substitute as a game bird. The pheasant occupies a variety of habitats within its range in North America, but it is most abundantly associated with intensive farming. In Illinois, as elsewhere, pheasants have become most abundant in the intensively cultivated cash-grain areas (Robertson 1958:13), fig. 1.

Several investigators (Leopold 1931, Marquardt & Scott 1952, Robertson 1958, Greeley 1960) have measured and mapped the distribution of pheasants in Illinois. In this report the previous literature is reviewed and new information and maps, figs. 2–8, on the distribution and abundance of pheasants in Illinois are presented. Information of this kind is useful in the proper management of the pheasant resource in Illinois, as well as for establishment of hunting regulations.

ACKNOWLEDGMENTS

Acknowledgments are made to the following personnel, present or past, of the Illinois Natural History Survey: Thomas G. Scott, Wildlife Specialist and Head, Section of Wildlife Research, who provided administrative and technical supervision throughout the study; Carl O. Mohr and Ralph E. Yeatter, Wildlife Specialists, who contributed both data and commentary on distribution of pheasants in Illinois; Mrs. Carl Chen, Laboratory Assistant, who compiled and analyzed many of the rural mail carrier reports; Jack A. Ellis, Research Associate, who gave many helpful suggestions throughout the study; James S. Ayars, Technical Editor, and Edward C. Visnow, Assistant Technical Editor, who edited the manuscript (Visnow also prepared the maps); and Wilmer D. Zehr, Assistant Technical Photographer, who did the photographic work.

William L. Preno, Game Biologist, Illinois Department of Conservation, provided new information from state-wide censuses of pheasants. Charles Davis, Secretary, Illinois Rural Letter Carriers Association, helped organize the rural mail carrier surveys, and nearly 1,000 rural mail carriers of Illinois participated in the surveys.

METHODS

Maps of regional or continental distribution of pheasants have been compiled by Leopold (1931:106), Walcott (1945:4), Aldrich & Duvall (1955:21), McCabe *et al.* (1956:275), and Wagner & Besadny (1958:5).

Many sources of data have been used to obtain indices to pheasant populations in large geographic areas. Leopold (1931), who compiled the first comprehensive report on the distribution of pheasants in Illinois and nearby states, obtained data from literature, from interviews and correspondence with local authorities, and from personal observations.

Later, as the pheasant became more abundant in Illinois, other workers estimated the annual harvest of cocks from two types of questionnaires filled out by hunters, and mapped the distribution of pheasant populations by *counties*.

Questionnaires of the first type, each attached as a stub to a hunting license, were to be filled out at the end of the hunting season by the holders of licenses and mailed to the Illinois Department of Conservation (Marquardt & Scott 1952:4; Carl O. Mohr unpublished). About 5 per cent of nearly a half million hunters returned license-stub questionnaires for the 1950-51 hunting season, according to Marquardt & Scott (1952:4), who recognized that, in the questionnaires returned, inaccuracies existed both as to the number of pheasants reported taken and the counties in which they were reported taken.

Questionnaires of the second type, each on a double postcard, were mailed after the hunting season to a small number of license holders whose names and addresses were taken from the records of the state agency issuing licenses to hunt small game. On these posthunting season questionnaires, hunters were asked to report the number of wild cocks they had shot and the counties in which they had killed them but not to report pheasants shot in public or private shooting preserves. The rates of return from these questionnaires (Robertson 1958:105) were much higher than those from the license-stub questionnaires. Robertson (1958:106) suspected four sources of bias in data derived from the posthunting season questionnaires: "(1) the tendency of the more successful hunters to reply to questionnaires more readily than less successful hunters; (2) the tendency of hunters to include the kill of other members of the hunting party in their reports; (3) the tendency to include kills made outside the area to which the report

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† Frederick Greeley was formerly Research Associate, and Stuart H. Mann is Research Assistant, both employed by the Illinois Department of Conservation under terms of the Federal Aid in Wildlife Restoration Act and assigned to the Illinois Natural History Survey for administrative and technical supervision; Greeley is now Associate Professor of Wildlife Management, University of Massachusetts, Amherst. Ronald F. Labisky is Associate Wildlife Specialist, Illinois Natural History Survey, Urbana.

referred; and (4) deliberate distortions of fact, usually exaggerations."

More direct efforts to estimate the state-wide abundance and distribution of pheasants were made by personnel of the Illinois Department of Conservation; these efforts involved winter sex ratios and spring counts of cock calls (William L. Preno unpublished). Spring counts of cock calls were obtained by recording the number of individual cocks heard crowing per 2-minute period at each of 20 stops located at 1-mile intervals along 20-mile standardized census routes; these census routes were established through most of the range occupied by pheasants in Illinois. The counting of cock calls was begun 40 minutes prior to sunrise and completed about 40 minutes after sunrise. Usually two spring call counts were taken annually on each census route between late April and late May; only the highest of the two counts was used in calculating distribution and abundance of pheasants along a route. The average number of cocks recorded per stop along each route was used as an index to the number of cocks in the area. Factors influencing the validity of crowing counts have been discussed in detail by Kimball (1949), who first described the technique, Kozicky (1952), and Carney & Petrides (1957).

During the winter preceding the spring counts of cock calls in Illinois, sex ratios had been obtained from roadside counts of pheasants. Efforts had been made to obtain the sex ratio of a sample of at least 200 pheasants as near as possible to each route where a spring count of cock calls was to be taken. The number of hens in each area at the onset of the breeding season was estimated by multiplying the number of cocks, as determined by the call counts in spring, by the number of hens per cock, as determined by the sex ratio obtained during the preceding winter.

In 1957 and 1958, information on the distribution of pheasants in Illinois was obtained through data collected by rural mail carriers. The rural mail carriers of the state made six 5-day counts of pheasants along their routes: in February of 1957, in January of 1958, and in April and August of each of these years. The first count included all 102 counties of the state. The remaining five counts were restricted to 76 counties, which included all the counties of the contiguous range. A map prepared by Greeley (1960:29) to show pheasant populations of Illinois in April, 1958, was based on a census by the rural mail carriers.

Questionnaires (postcards), with letters of instruction, were used in all six censuses. For the first two censuses they were mailed directly to individual mail carriers listed by the Illinois Rural Letter Carriers Association and for the other four censuses to postmasters at all post offices having rural routes. In the last four censuses, the postmaster distributed the postcard questionnaires and instructions to the local mail carriers. The mail carriers were asked to report the counties and townships in which their routes were located, the length of each route in miles, and the number of pheasants (cocks, hens, chicks, and broods) observed along the route on each of the 5 consecutive days specified in the instructions submitted with questionnaires. If the route of a mail carrier extended into two or more townships, the reported data were divided equally among all the townships listed on the questionnaire. The number of miles driven and the number of pheasants seen during the 5-day period were used to calculate the number of pheasants observed per 100 miles of roadside observation in each *township*. Township units were used to map the distribution and abundance of pheasants in Illinois, figs. 2–8. The use of township units for mapping the range of pheasants has the advantage of geographically refining the limits of distribution and abundance to a greater extent than if units the size of a county, or larger, are used.

Investigators have recognized that there is sampling error and bias in most data used in mapping distribution and abundance of pheasant populations. The data on which the maps presented in this report are based undoubtedly contain both error and bias, but field observations have tended to confirm the patterns of distribution shown for Illinois — sometimes in remarkable detail.

EVALUATION OF COUNTS BY RURAL MAIL CARRIERS

Rural mail carrier censuses of pheasants have been employed in Nebraska, North Dakota, South Dakota, Iowa, Missouri, Montana (Kimball *et al.* 1956:237–9), Michigan (MacMullan 1960:56–62), and Indiana (reported by William E. Ginn at Fourteenth Midwest Wildlife Conference, Des Moines, Iowa, 1952). Biases involved in censuses by rural mail carriers have been recognized by all investigators using these censuses, but the data obtained by such censuses in most states have been found very useful for determining annual indices to the abundance of pheasants and for showing pheasant distribution patterns.

Rural mail carriers in Illinois exhibited interest and participated enthusiastically in censusing pheasants. Nearly three-fourths of the questionnaires distributed to the carriers were returned, and most of the returned questionnaires contained usable information, table 1. In the percentage of questionnaires returned, there was no significant difference between those distributed directly to the carriers and those distributed to the carriers via postmasters.

Several variable factors influenced the counts of pheasants by mail carriers; principally because the effects of each were difficult to measure, no allowance was made for them when the data were analyzed. Among these factors were (1) differences in interest or observational skill of the individual carriers, (2) plumage differences between cock and hen pheasants, (3) behavioral differences between cocks and hens, (4) seasonal differences in the amounts of vegetative growth, (5) differences in the amounts of snow cover

Table 1. — Response of rural mail carriers in Illinois to questionnaires relating to abundance of pheasants along their routes, 1957 and 1958.

Date	Number of Counties Censused	Number of Questionnaires Mailed	Per Cent of Questionnaires Returned	Per Cent of Returned Questionnaires Usable
1957				
February	102	1,634	76.0	97.4
April	76	1,284	65.0	96.4
August	76	1,423	62.5	90.3
1958				
January	76	1,385	76.3	97.3
April	76	1,390	76.7	....*
August	76	1,426	72.9	....*
Mean			71.6	95.4

* Not calculated.

during the winter counts, and (6) differences in such weather elements as wind, sunlight, temperature, precipitation, and dew.

Although individual differences undoubtedly existed among the carriers in their interest in this project and their ability to observe pheasants, few if any had been trained in censusing pheasants, and such differences as existed would tend to cancel each other over large, although perhaps not township, areas.

The reported differences in the distribution and abundance of pheasants in the winters of 1957 and 1958, figs. 2 and 3, were probably due partly to the effect of snow with respect to the observability of pheasants and partly to an increase, in 1958, in the number of cocks in the population. The distribution and amount of snow are quite variable in Illinois; it is unusual for the entire pheasant range to have snow on the ground in appreciable quantities at one time. Although snow cover was present at the beginning of the census period in February, 1957, a thaw removed much of the snow over a large area in the northern counties of the state before the 5-day census was completed. In January, 1958, there was deep snow (5–20 inches) over the census area except in portions of east-central and south-central Illinois. Average range-wide winter counts were 1.7 cocks and 4.4 hens per 100 miles in February, 1957, and 4.8 cocks and 10.1 hens per 100 miles in January, 1958, table 2. Evidence other than from rural mail carrier counts indicated that, at least in east-central Illinois, there were more cocks in the winter of 1958 than in the winter of 1957, but that the abundance of hens was similar. Rural mail carriers observed a relatively greater number of cocks in 1958 than in 1957; sex ratios were 2.6 hens per cock in February, 1957, and 2.1 hens per cock in January, 1958, table 2.

Fewer hen pheasants were seen by rural mail carriers in April than in winter, table 2, although in April the landscape is still quite barren of vegetation. Relatively greater numbers of the cocks present were observed during the April surveys than during the winter counts, as indicated by seasonal differences in sex ratios; because of their behavior, as well as color, cocks are more conspicuous than hens during the breeding season. The conditions for observing pheasants are probably more nearly constant from year to year in April than in any other month. April, therefore, may be the best time to use rural mail carrier censuses for obtaining annual indices of pheasant abundance.

In August, development of vegetation restricts the field of vision of observers. During this month, the number of pheasants observed by the rural mail carriers was below the number seen in winter or spring, table 2, even though more pheasants were present. The presence or absence of rain or dew on vegetation in the mornings probably affected the counts of pheasants made by carriers in August; rural mail routes are generally driven in the morning. Pheasants (chicks particularly) seemingly tend to avoid wet vegetation by loafing on and along rural roads at this time of year, where they are easily visible. In Michigan, the validity of summer brood counts as measures of population changes from year to year was shown by direct correlation of brood counts by rural mail carriers with estimates of the state-wide kill of cocks during subsequent hunting seasons (MacMullan 1960:106–14).

The factors listed above unquestionably influenced the reliability of counts of pheasants by rural mail car-

Table 2. — Miles driven and adult pheasants reported by rural mail carriers in 76 counties of Illinois, 1957 and 1958.

Category	1957			1958			Total
	February	April	August	January	April	August	
Miles driven	234,295	190,775	209,330	253,055	253,685	251,405	1,392,538
Cocks observed	3,972	7,247	1,137	12,171	10,298	1,352	36,177
Hens observed	10,361	9,162	2,461	25,622	9,282	2,482	59,371
Hens per cock	2.6	1.3	2.2	2.1	0.9	1.8	1.6
Cocks per 100 miles	1.7	3.8	0.5	4.8	4.0	0.5	2.6
Hens per 100 miles	4.4	4.8	1.2	10.1	3.7	1.0	4.3
Pheasants per 100 miles	6.1	8.6	1.7*	14.9	7.7	1.5†	6.9

* In addition to adult pheasants, 6,704 chicks were observed in August, 1957. If these chicks were included in the counts, the number of pheasants observed per 100 miles would be 4.9.

† In addition to adult pheasants, 7,414 chicks were observed in August, 1958. If these chicks were included in the counts, the number of pheasants observed per 100 miles would be 4.5.

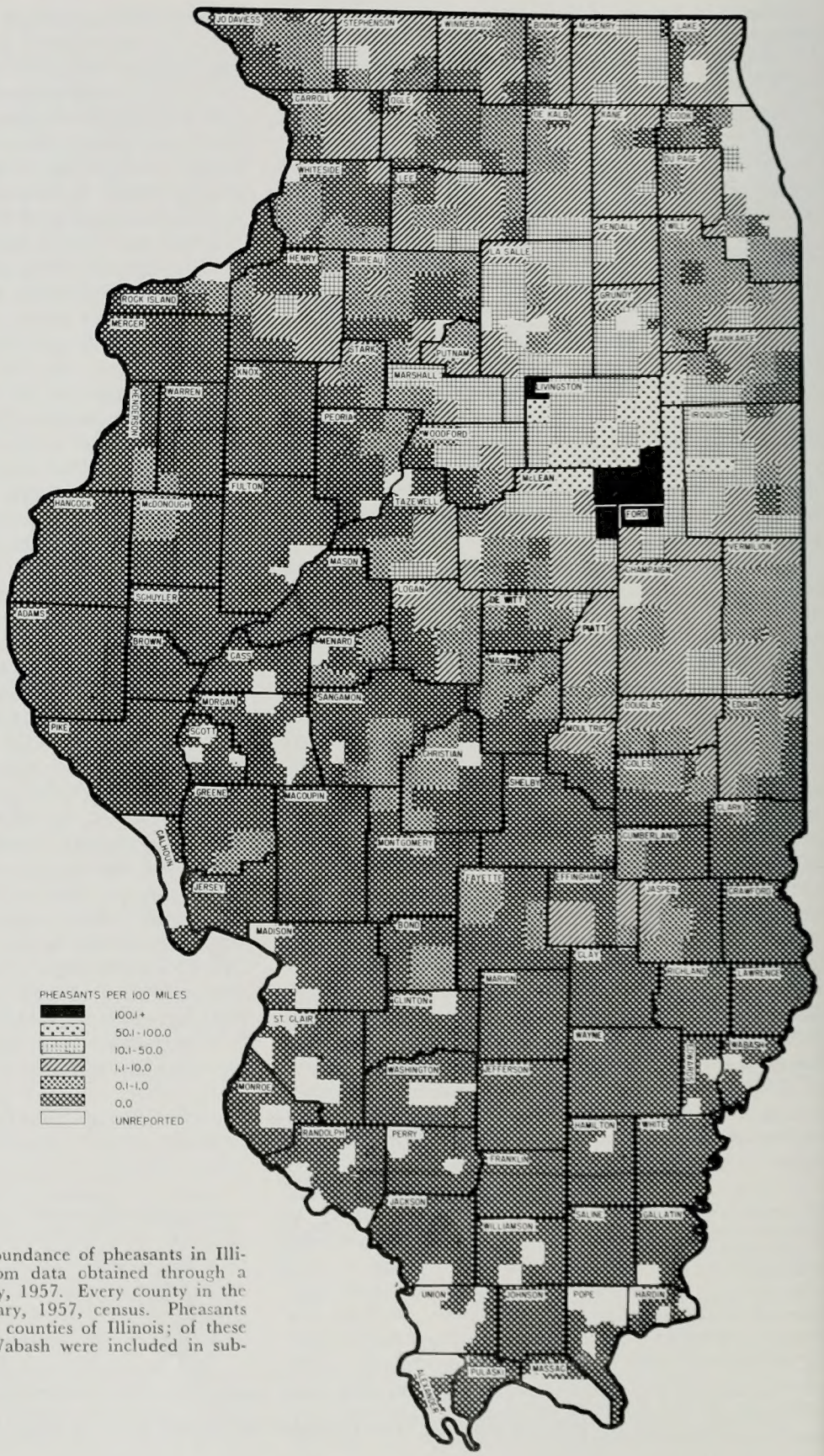

Fig. 2. — Distribution and abundance of pheasants in Illinois as mapped by townships from data obtained through a rural mail carrier census, February, 1957. Every county in the state was included in the February, 1957, census. Pheasants were not reported in 28 southern counties of Illinois; of these 28 counties, only Edwards and Wabash were included in subsequent censuses, figs. 3–7.

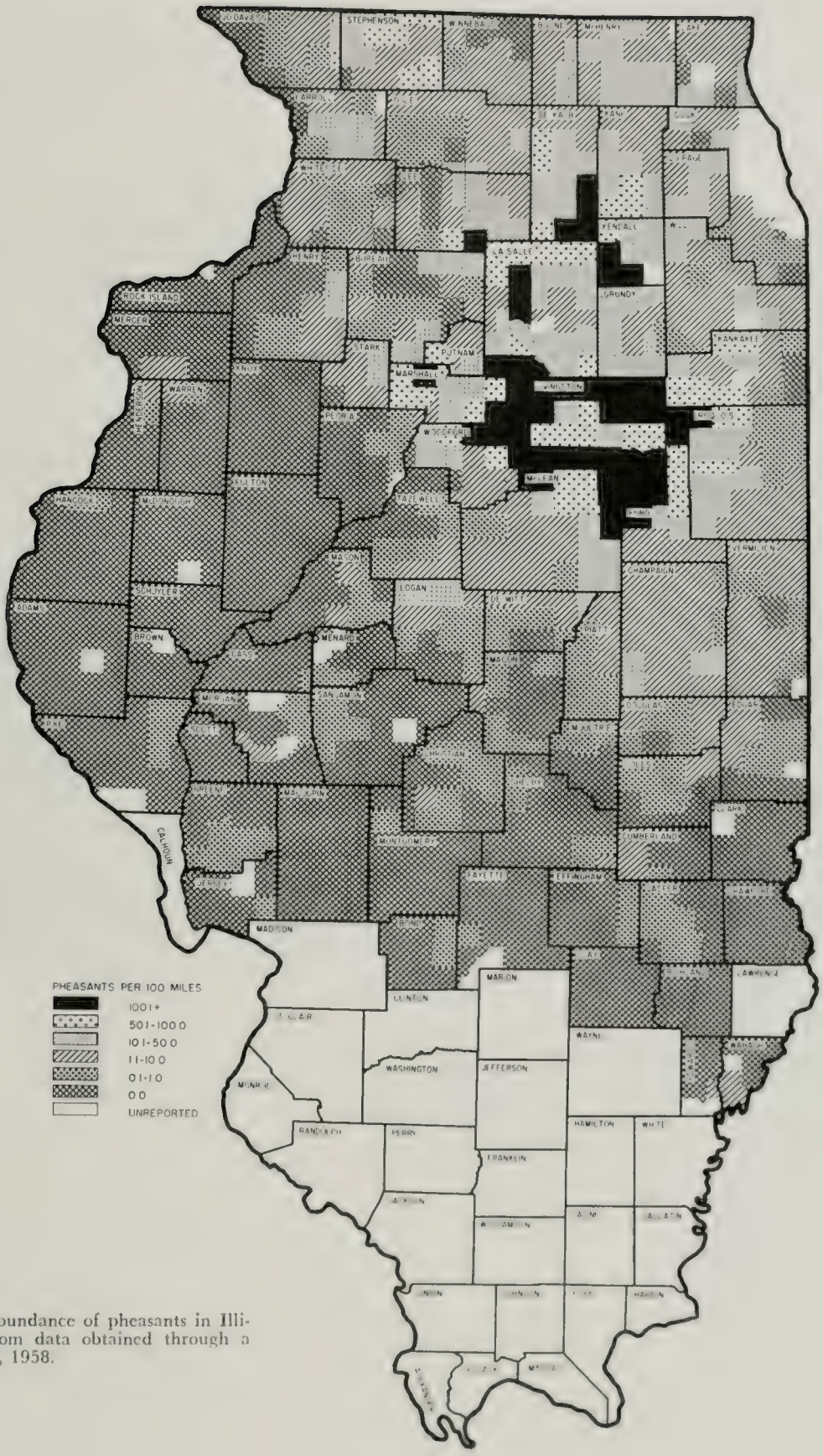

Fig. 3. — Distribution and abundance of pheasants in Illinois as mapped by townships from data obtained through a rural mail carrier census, January, 1958.

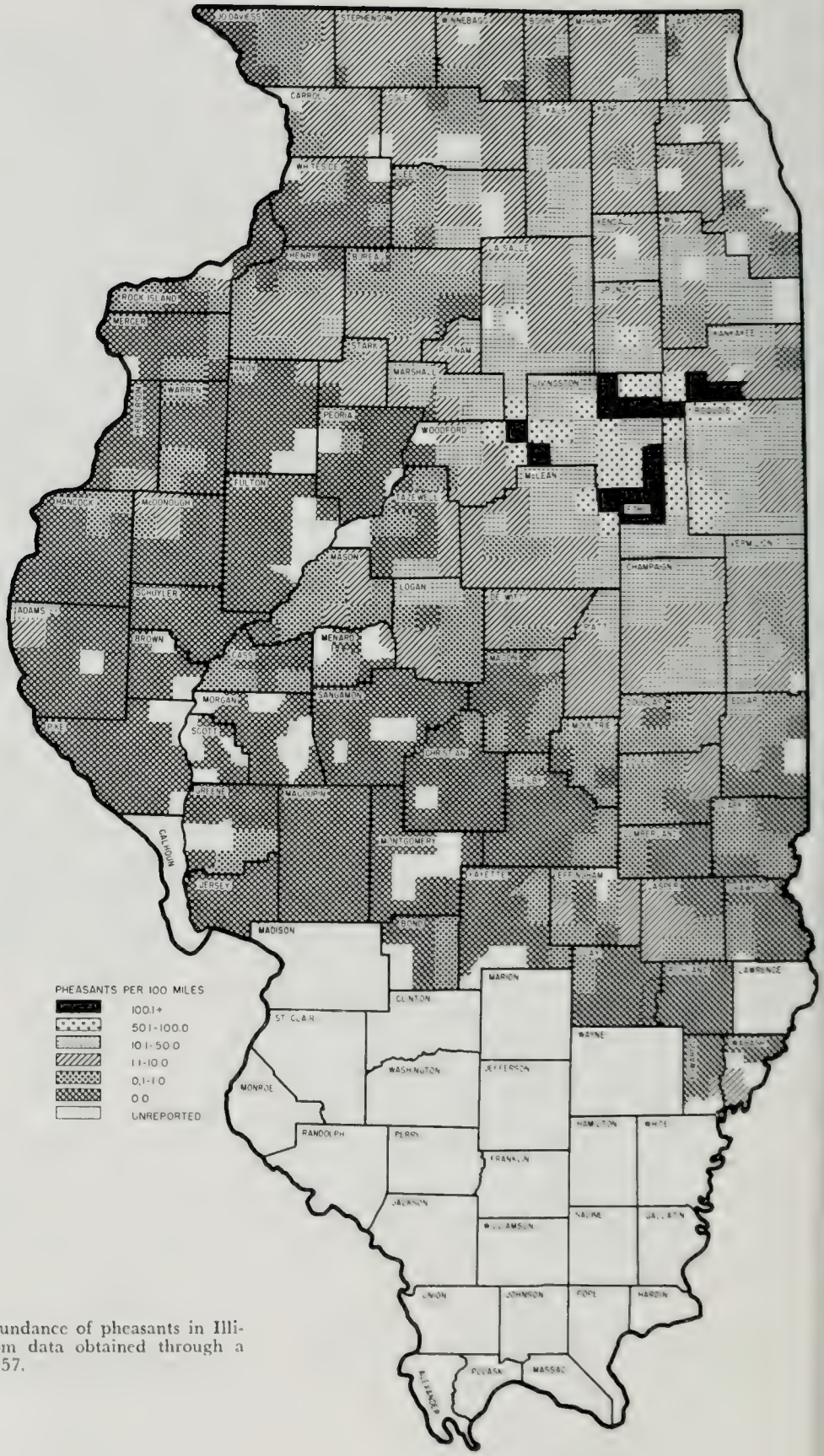

Fig. 4. — Distribution and abundance of pheasants in Illinois as mapped by townships from data obtained through a rural mail carrier census, April, 1957.

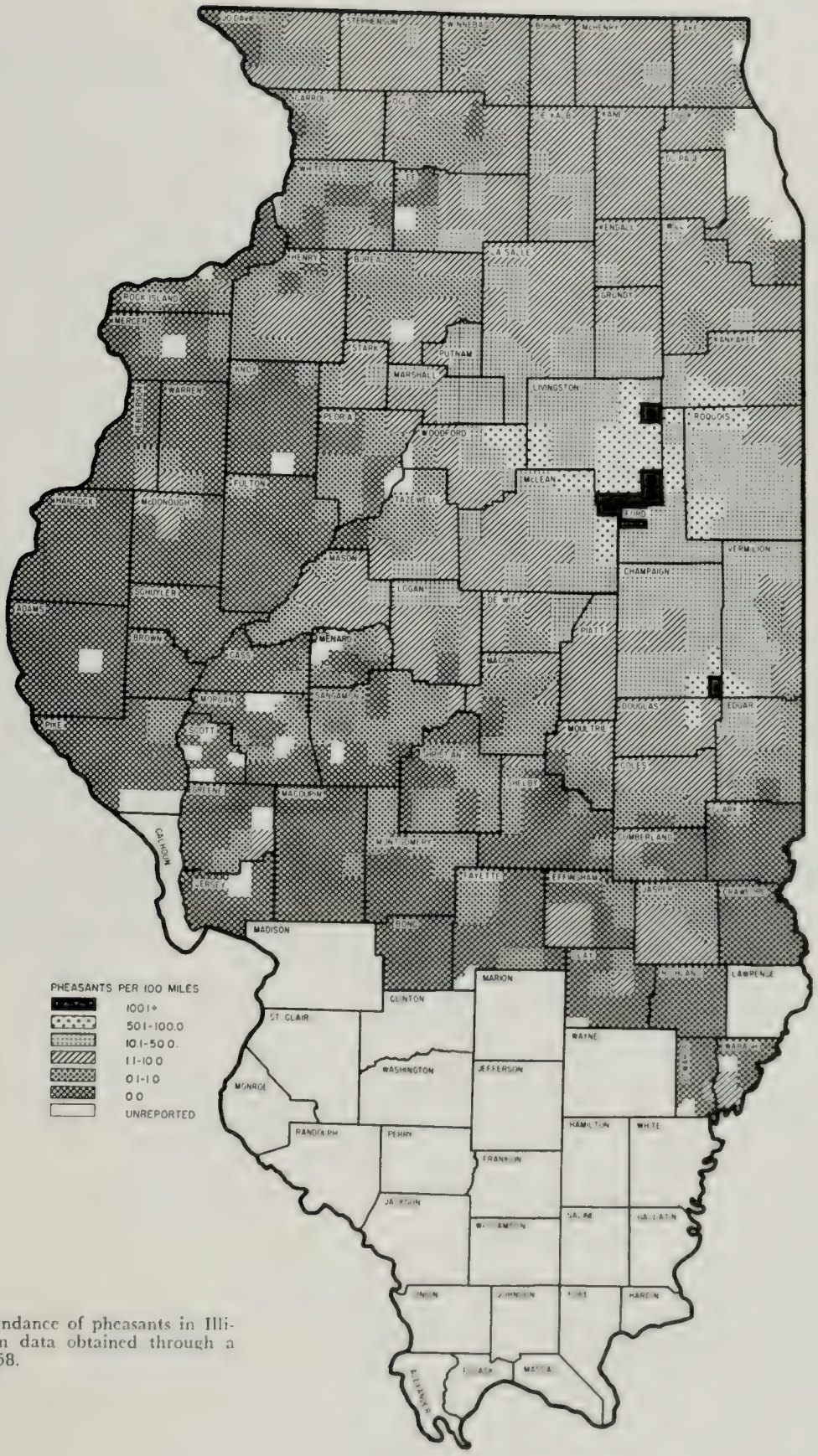

Fig. 5. — Distribution and abundance of pheasants in Illinois as mapped by townships from data obtained through a rural mail carrier census, April, 1958.

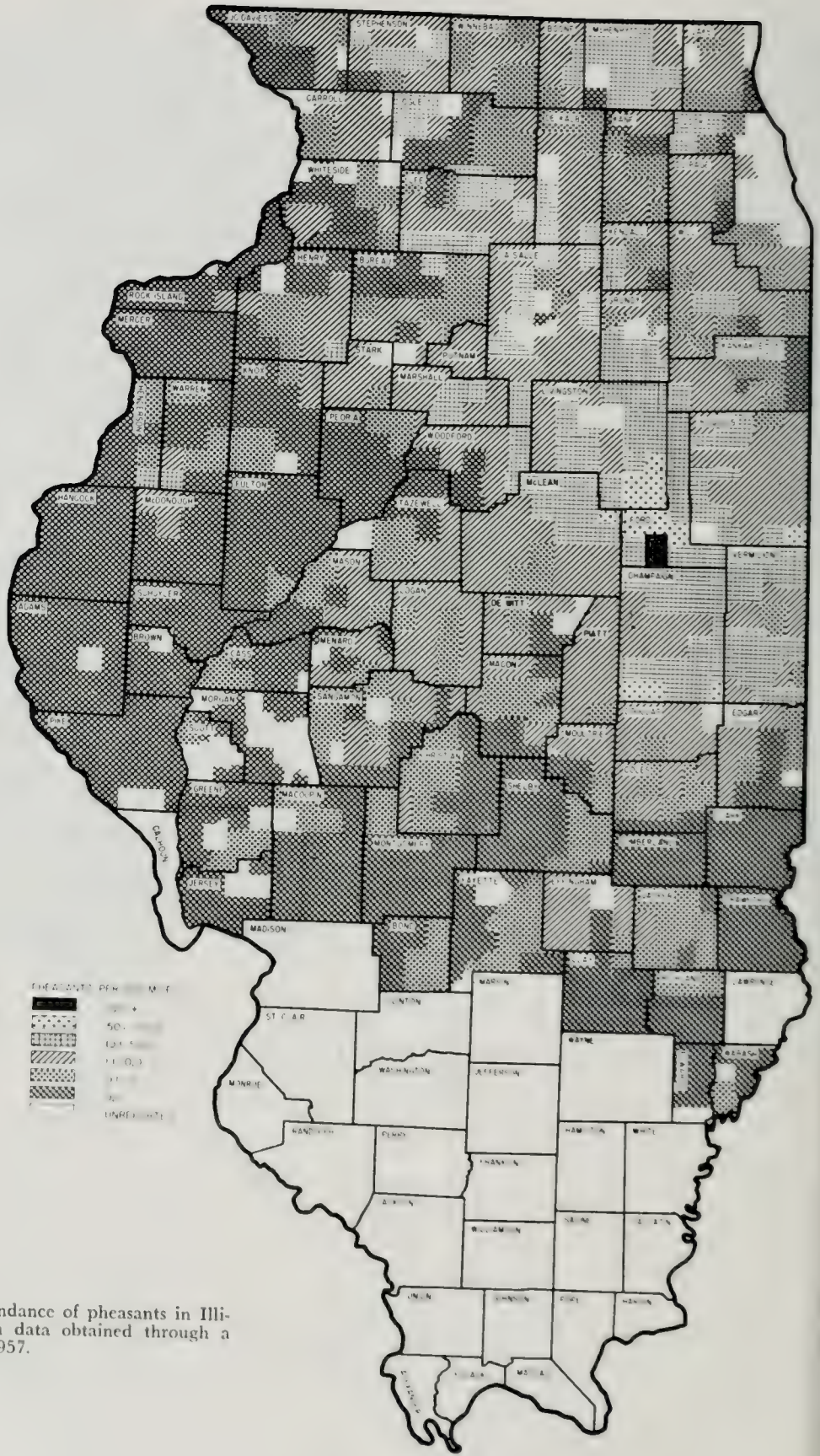

Fig. 6. Distribution and abundance of pheasants in Illinois as mapped by townships from data obtained through a rural mail carrier census, August, 1957.

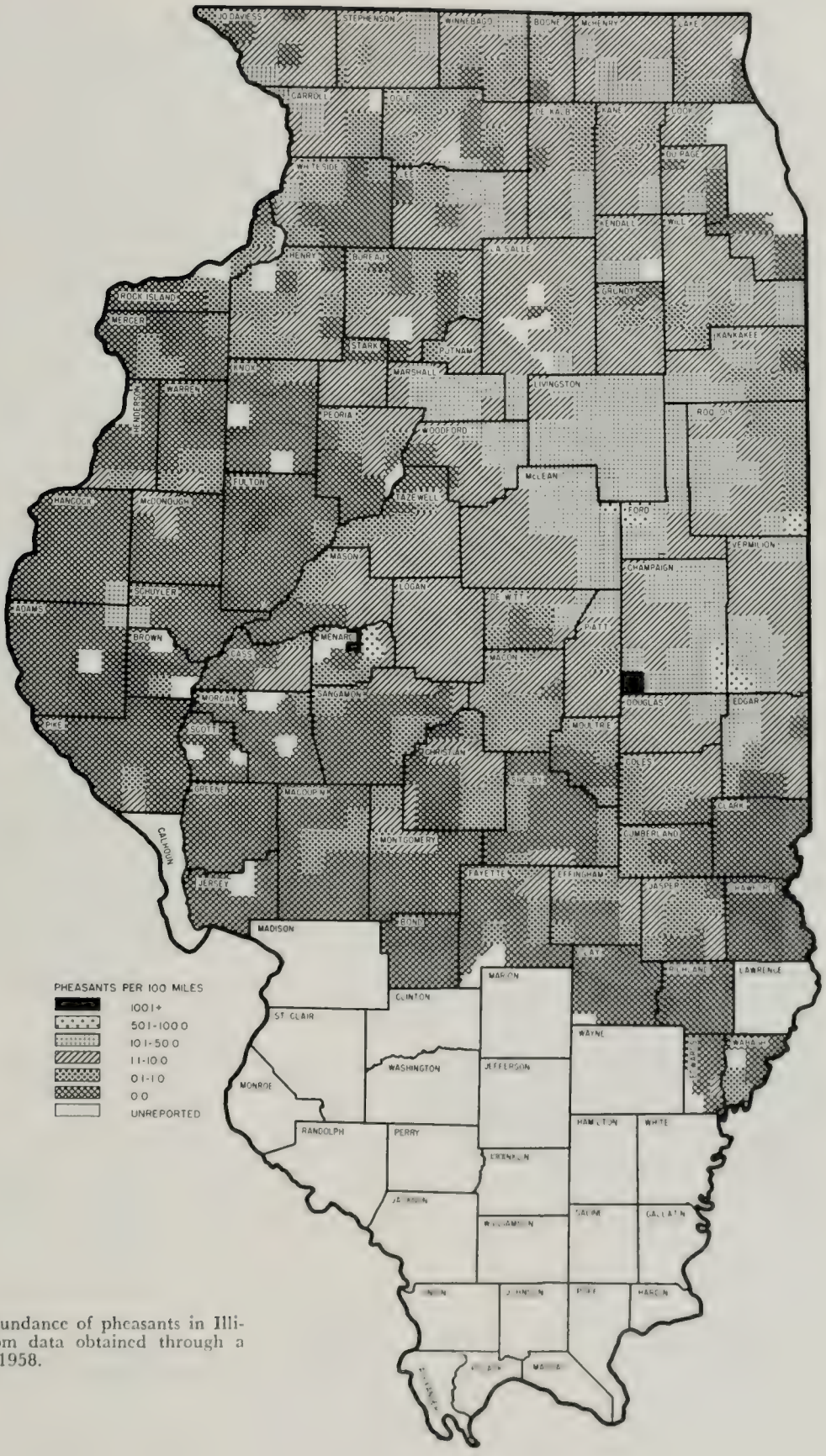

Fig. 7. — Distribution and abundance of pheasants in Illinois as mapped by townships from data obtained through a rural mail carrier census, August, 1958.

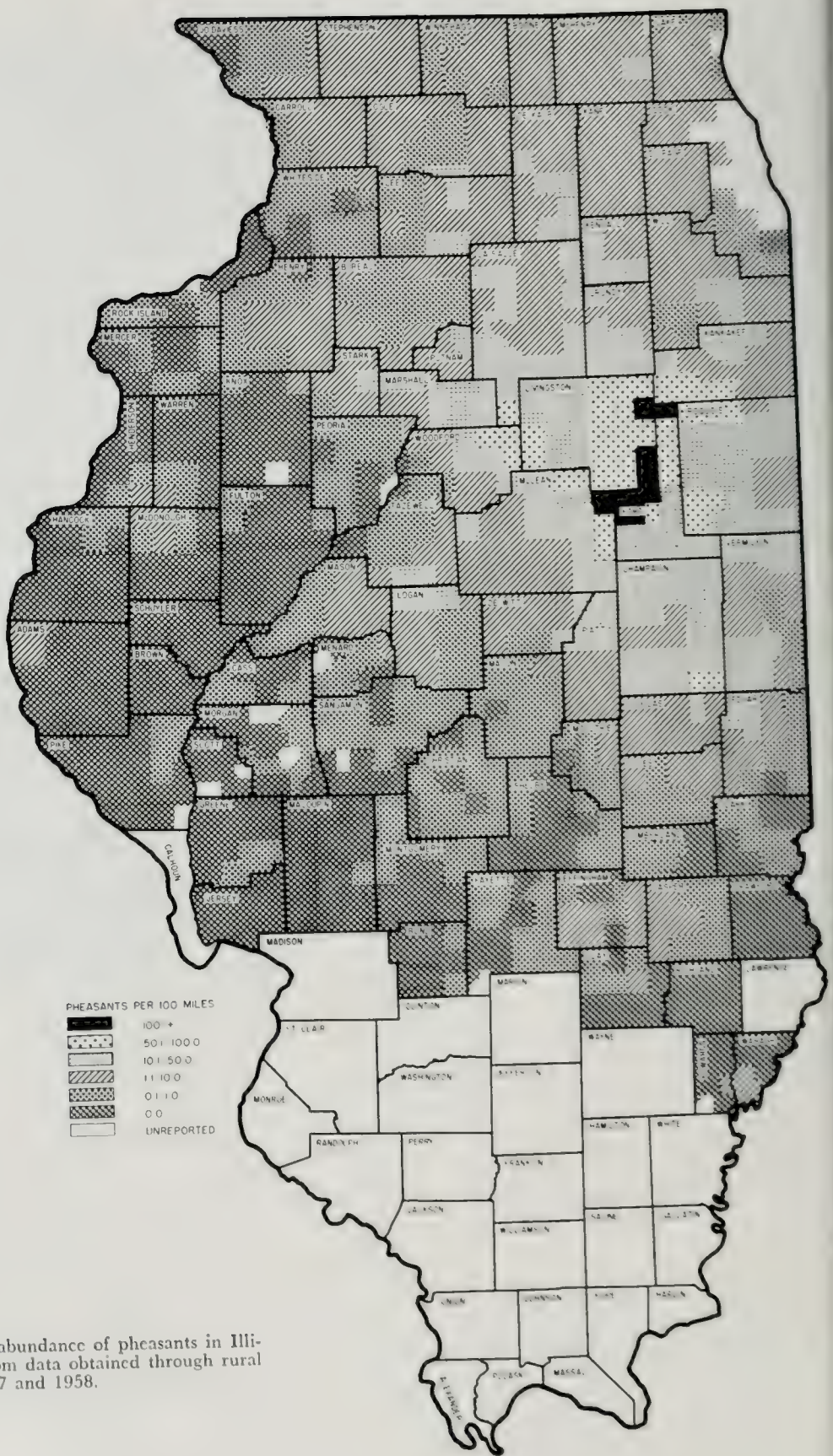

Fig. 8. — Distribution and abundance of pheasants in Illinois as mapped by townships from data obtained through rural mail carrier censuses, April, 1957 and 1958.

riers in Illinois for small areas (townships) and for any one season (winter, spring, or summer). However, because the variable factors did not differ greatly during the 2 years of the censuses, they are regarded as having little influence on the reliability of the population trends that are presented for the Illinois pheasant range as a whole.

DISTRIBUTION AND ABUNDANCE DATA

The range of the pheasant in Illinois, as mapped by Wagner & Besadny (1958:5), is part of a more or less continuous belt of wild populations extending from southeastern Wisconsin through northeastern and east-central Illinois, northern Indiana, southern Michigan, and eastward into Ohio and Pennsylvania, fig. 9. From Illinois eastward to the Atlantic Coast, the approximate southern limit of the range as reported by Yeatter (1953:7) is marked by the 40th parallel; the 40th parallel can be located in fig. 9 by extending the Kansas-Nebraska line eastward. Most of the range occupied by pheasants in Illinois is north of the 40th parallel, but some pheasants are found south of this line, principally in Champaign, Douglas, Vermilion, and Edgar counties.

Robertson (1958:2–5) traced the early introduction of pheasants by private individuals in Illinois back to 1890 and reported that pheasants were first distributed in the state by the Illinois Game Commission (now Illinois Department of Conservation) in 1906. The early optimism of the Illinois legislature in opening the first hunting season for pheasants in 1915 reflected the growing availability of the bird either from game-farm released pheasants or localized wild populations.

The first map of the distribution of pheasants in Illinois and several other north-central states was compiled by Leopold (1931:106) from data accumulated during 1928 and 1929. A reproduction of the Illinois portion of this map, modified to show only the general distribution of pheasants, is presented in fig. 10. It is apparent from Leopold's map that the earliest establishment of pheasants on a large scale in Illinois occurred

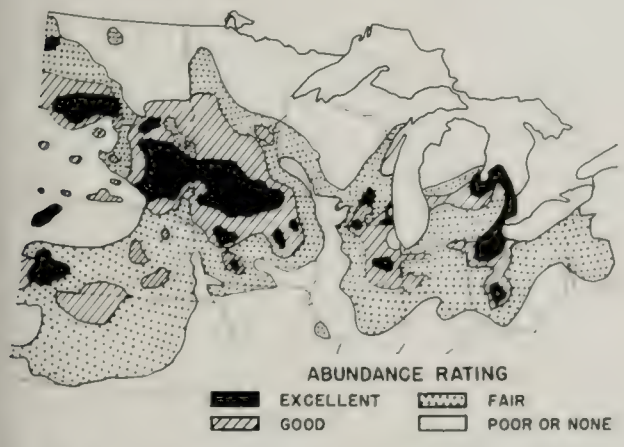

Fig. 9. — Generalized map of the distribution and relative abundance of pheasants in the north-central states in the 1950's (after Wagner & Besadny 1958:5).

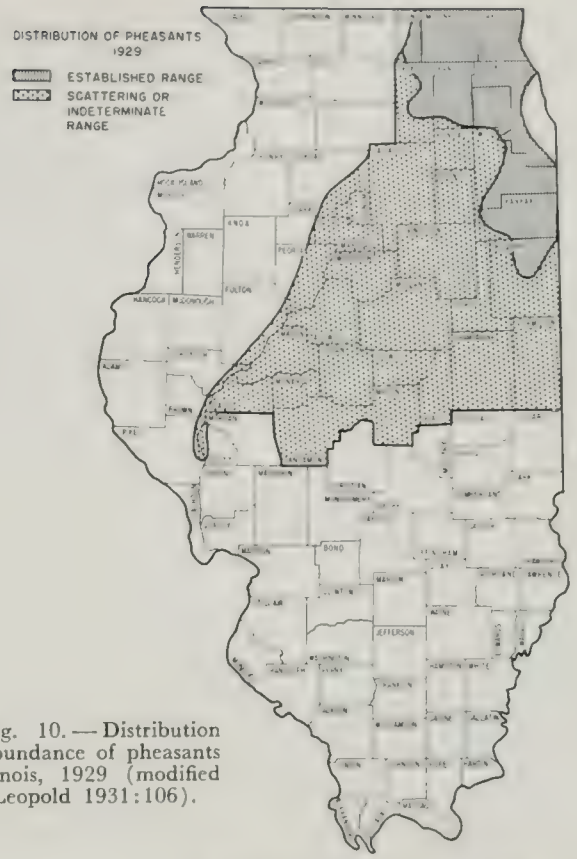

Fig. 10. — Distribution and abundance of pheasants in Illinois, 1929 (modified from Leopold 1931:106).

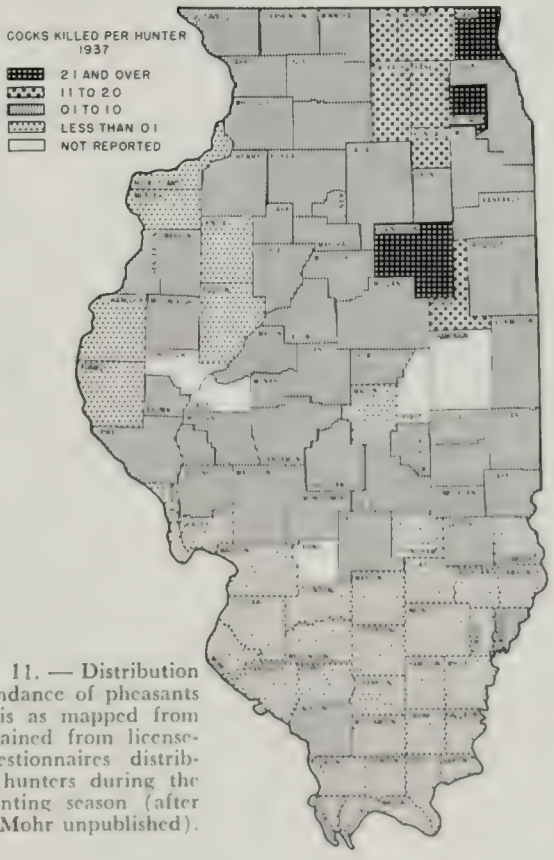

Fig. 11. — Distribution and abundance of pheasants in Illinois as mapped from data obtained from license-stub questionnaires distributed to hunters during the 1937 hunting season (after Carl O. Mohr unpublished).

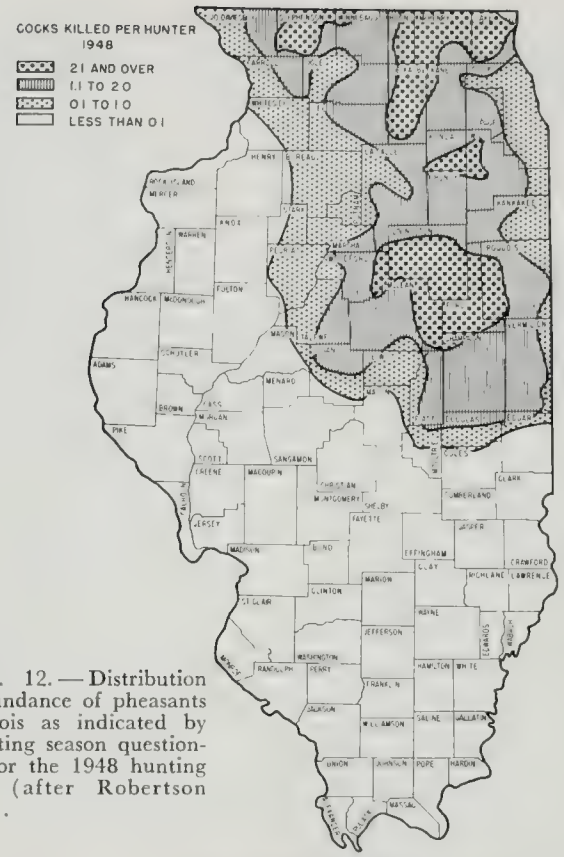

Fig. 12. — Distribution and abundance of pheasants in Illinois as indicated by posthunting season questionnaires for the 1948 hunting season (after Robertson 1958:9).

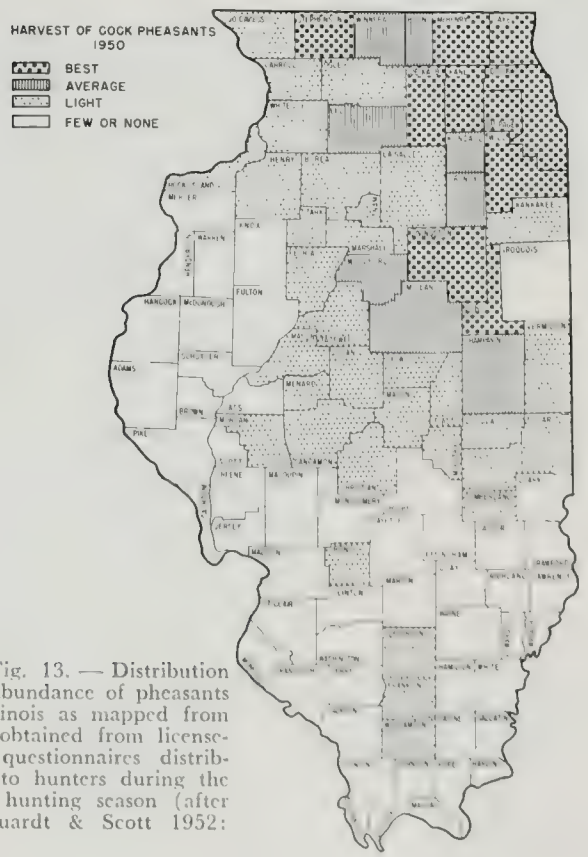

Fig. 13. — Distribution and abundance of pheasants in Illinois as mapped from data obtained from license-stub questionnaires distributed to hunters during the 1950 hunting season (after Marquardt & Scott 1952:5).

in the northeastern counties in the 1920's. That pheasants were not common during the 1920's in the area described by Leopold as "scattering" or "indeterminate" range was substantiated by Robertson (1958:10), who cited the records of amateur ornithologists active in east-central Illinois at that time.

Pheasants became increasingly common in east-central Illinois during the early 1930's. Yeatter (*in* Robertson 1958:10) indicated that pheasants were "relatively well established" in Champaign and adjacent counties by 1934. Mohr's data (unpublished) based on the number of cocks killed per hunter per county indicated that less than 15 per cent of the hunters residing in the southern and western counties of Illinois were successful in bagging at least one cock pheasant each in 1937, whereas 58–68 per cent of the hunters residing in certain counties of northeastern and east-central Illinois bagged at least one cock each during the same hunting season. Mohr's map of the pheasant kill, fig. 11, shows some westward and southward extension of the pheasant range and the establishment of a center of abundance in Ford and Livingston counties of east-central Illinois.

Maps prepared by Robertson (1958:9) for 1948, fig. 12, and by Marquardt & Scott (1952:5) for 1950, fig. 13, from hunters' reports show patterns of distribution of pheasants somewhat similar to those indicated by Leopold and Mohr, but the centers of abundance in northeastern and east-central Illinois show better delineation than the earlier maps. They show the southern and the central western counties of the state still unoccupied by pheasants and indicate the existence of a small center of abundance of birds in Stephenson County of northwestern Illinois, a population not evident on Mohr's 1937 map.

In Illinois, the six roadside counts by rural mail carriers in 1957 and 1958 were averaged in order to rank 74 of the state's 102 counties with respect to their relative abundance of pheasants. The ranking was based on the mean number of pheasants observed per 100 miles in each county during the six mail carrier censuses, fig. 14. Livingston County ranked highest with 75.2 pheasants per 100 miles. No pheasants were observed in 28 southern counties of the state during the February, 1957, census, and these counties were classed as nonpheasant range. However, pheasants were released experimentally in Wabash and Edwards counties subsequent to the February, 1957, census. Between 30 and 40 per cent of all pheasants reported during each of the six roadside counts were observed in Ford and Livingston counties.

A composite map based on the data collected by rural mail carriers in Illinois during the breeding seasons in April, 1957 and 1958, is presented in fig. 8; these April counts best represent the distribution and abundance of the population of pheasants available for reproduction. The highest counts reported by rural mail carriers were from townships in southeastern Livingston

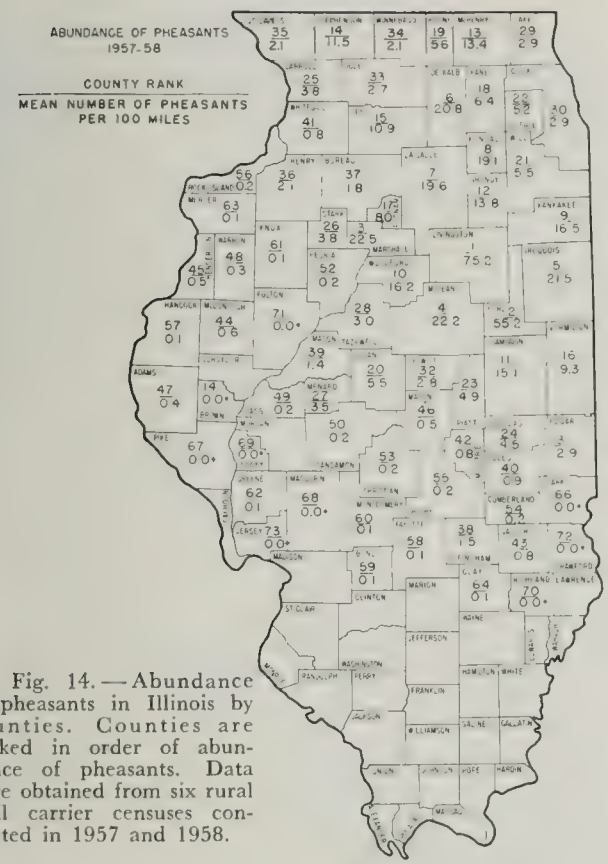

Fig. 14. — Abundance of pheasants in Illinois by counties. Counties are ranked in order of abundance of pheasants. Data were obtained from six rural mail carrier censuses conducted in 1957 and 1958.

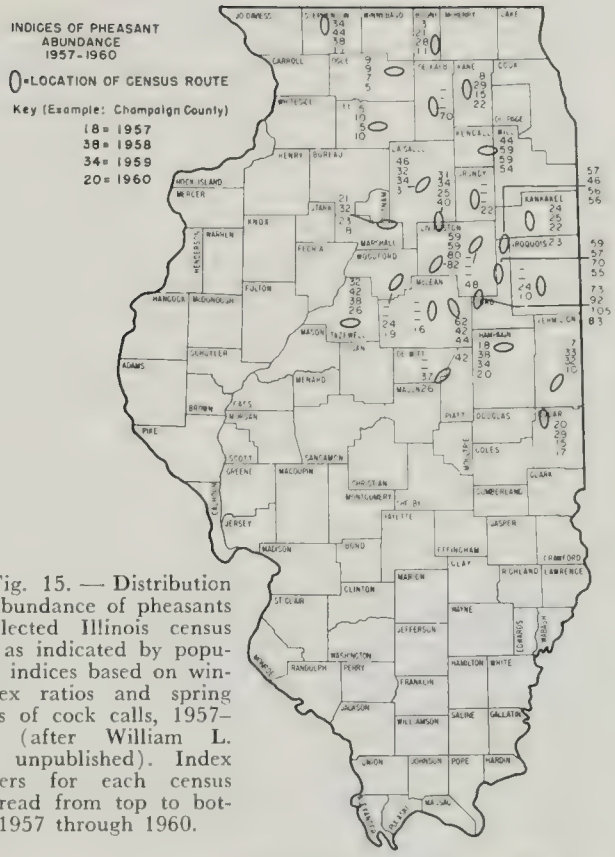

Fig. 15. — Distribution and abundance of pheasants in selected Illinois census areas as indicated by population indices based on winter sex ratios and spring counts of cock calls, 1957–1960 (after William L. Preno unpublished). Index numbers for each census area read from top to bottom, 1957 through 1960.

County and adjacent portions of Ford County. Detailed ecological studies on a township-sized study area in this region indicated that pheasants numbered 63, 80, and 88 birds per square mile in January, 1957 and 1958, and February, 1960, respectively. Pheasants declined in numbers in all directions from the nucleus of abundance in Ford and Livingston counties; this decline was most apparent to the southwest.

The rural mail carrier counts showed some populations of pheasants, usually of low levels, outside the boundaries of the contiguous range, fig. 8. Some of these outlying populations have persisted for many years. One such population, greater in numbers and more persistent than other outlying populations, is located in Logan and Tazewell counties. A small population of pheasants has existed in Bond County, about 40 miles east of St. Louis, for many years, and most of the township distribution maps in this report indicate the presence of an isolated population of pheasants where Hancock, Henderson, McDonough, and Warren counties in western Illinois come into close proximity. The extent to which these small, persistent populations are maintained through periodic releases of pheasants by private individuals or agencies is not known. Some of the pheasants observed by rural mail carriers in Cumberland, and probably all of the pheasants reported in Edwards and Wabash counties, which are south of the contiguous range currently occupied by pheasants in

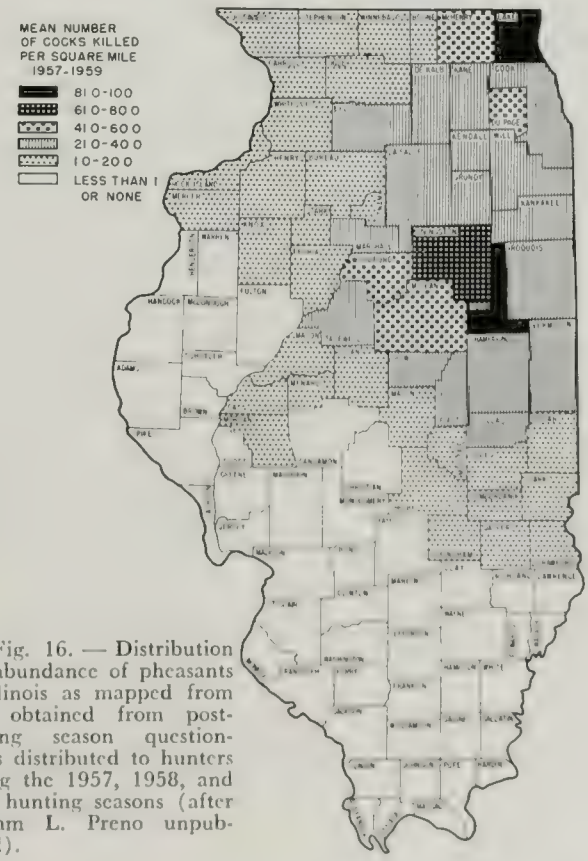

Fig. 16. — Distribution and abundance of pheasants in Illinois as mapped from data obtained from post-hunting season questionnaires distributed to hunters during the 1957, 1958, and 1959 hunting seasons (after William L. Preno unpublished).

Illinois, were birds liberated on experimental areas by the Illinois Natural History Survey and the Illinois Department of Conservation, or progeny of these birds.

Abundance data based on winter sex ratios and spring counts of cock calls during the 4-year period, 1957–1960, fig. 15, substantiate fairly well the distributional and abundance data reported by rural mail carriers, fig. 8. The highest population indices were in Ford and Livingston counties, a finding that supports other observations that the center of greatest abundance of pheasants in Illinois is located in this east-central area.

Preno's estimates of the kill of cocks per square mile for the 3-year period, 1957–1959, estimates based on postcard questionnaires, appear to be high, fig. 16. The percentages of cocks harvested on a township-sized area in Ford County, near the junction of Livingston and McLean counties, during the same 3 years were calculated to be 20, 57, and 66 per cent, respectively; these data were based on changes between the prehunt and posthunt sex ratios (no allowances were made for illegal kill of hens). Harvest statistics by individual counties, on which fig. 16 is based, show a kill of 62, 129, and 93 cocks per square mile in Ford County for 1957, 1958, and 1959, respectively. The application of the number representing the proportion of cocks harvested, as indicated by changes in sex ratios, to the estimated kill of cocks per square mile would yield prehunt estimates of 310, 226, and 140 cocks per square mile. However, the prehunt population on the township area mentioned above was estimated to be 47 cocks per square mile in November, 1957, and the abundance of pheasants in this township is considered to be as high as, or nearly as high as, that in the remainder of Ford County, fig. 8. Even though most county estimates of the kill of cocks are probably too high, these kill statistics tend to confirm the patterns of distribution and abundance previously presented in this report.

SUMMARY

Pheasants first established self-maintaining populations in several northeastern counties of Illinois during the 1920's. They spread westward and southward and had established a center of abundance in Livingston and Ford counties in east-central Illinois by the late 1930's, a center that has persisted through the 1940's and 1950's. Small areas of abundance existed in northeastern Illinois and in Stephenson County of northwestern Illinois in the late 1940's; some of these areas of abundance have persisted but at lower population levels. Pheasants have never established self-maintaining populations in the central western and southern counties of Illinois, except in a few small areas where populations exist at low levels of abundance.

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